

Polynomials and Solving Equations Topics

$$3x^3 + 2x^2 + 3x \quad \text{--- Trinomial}$$
$$\text{Addition \& Subtraction (Group Like Terms)}$$
$$\underline{4x^2} + \underline{3t^4} - \underline{2x^2} + \underline{7t^4} + \underline{3t^2}$$
$$2x^2 + 10t^4 + 3t^2$$

x and ÷

$$\frac{4t^4}{2t^2} = 2t^{4-2}$$
$$= 2t^2$$

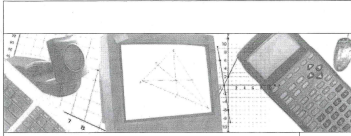
Distributive Property

$$-3x^2y(2x^2y - 2x^3y^2)$$
$$-6x^4y^2 + 6x^5y^2$$

Solving Equations

$$\frac{2x}{3} + 4 = 16 \quad \begin{matrix} 1) + \text{and} - \\ 2) \times \text{and} \div \end{matrix}$$
$$\frac{2x}{3} = 16 - 4$$
$$\times (\frac{3}{2}x) = (12) \times$$
$$\frac{2x}{2} = \frac{36}{2}$$
$$x = 18$$


Jan 10-8:14 AM



# Academic

## Grade 9 Assessment of Mathematics

### Polynomials and Equations Practice Materials



Education Quality and Accountability Office

Key Words

Throughout the assessment, key words are used to identify the type of response required from you. The key words are explained below. Refer to this sheet to make sure you are responding fully to each question.

**Compare:**  
Tell what is the same and what is different.

**Describe:**  
Use words to create a mental picture for the reader.

**Determine:**  
Use mathematics to find a solution to the problem.

**List:**  
Use point form.

**Explain:**  
Use words and symbols to make your solution clear.

**Justify:**  
Give reasons and evidence to show your answer is correct.

**Show your work:**  
Record all calculations and all the steps you went through to get your answer. You may use words, numbers, graphs, diagrams, symbols and/or charts.

Multiple Choice

Grade 9 Assessment of Mathematics, Polynomials & Equations

1 Four students try to solve the equation  $5x - 3 = 2x + 9$ . The following table shows part of each student's solution.

|          |            |
|----------|------------|
| Nadine   | $-12 = 3x$ |
| Paul     | $-3x = 6$  |
| Joseph   | $6 = 3x$   |
| Michelle | $3x = 12$  |

Which student is correct?

A Nadine  
B Paul  
C Joseph  
D Michelle


2 Which of the following represents the expression  $3(2x + 1) - 3(5x - 4)$  in a simplified form?

A  $-4x - 3$   
B  $-4x - 5$   
C  $-4x + 5$   
D  $-4x + 11$


E  $-9x + 15$

3 Eric and Julie are each asked to solve an equation.

I solved  $3x = x + 12$ . My answer is  $x = 6$ .



I solved  $3x = 4x + 12$ . My answer is  $x = 6$ .



Who has correctly solved his or her equation?

F Eric only  
G Julie only  
H Both Eric and Julie  
J Neither of them

Multiple Choice

Grade 9 Assessment of Mathematics, Polynomials & Equations

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Multiple Choice


Grade 9 Assessment of Mathematics, Polynomials & Equations

4 Determine the value of x in the following equation:

$$\frac{2x}{3} + 4 = 3$$

A  $-\frac{2}{3}$   
B  $-\frac{3}{2}$   
C  $\frac{9}{2}$   
D  $\frac{21}{2}$

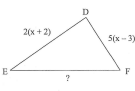
5 The cost, C, in dollars to print leaflets, n, is given by the formula  $C = 35 + 0.03n$ .



What is the cost of printing 900 leaflets?

A \$27.00  
B \$35.00  
C \$37.70  
D \$62.00

6 The perimeter of triangle DEF is given by the expression  $11x - 15$ .



Which expression shows the correct length of side EF?

A  $4x - 4$   
B  $4x - 14$   
C  $7x - 1$   
D  $7x - 11$

7 Which value of x satisfies the equation  $5 - 2x = 9$ ?

F  $x = -7$   
G  $x = -2$   
H  $x = 2$   
J  $x = 3$

Multiple Choice

Grade 9 Assessment of Mathematics, Polynomials & Equations

1

Determine the value of  $x$  in the following equation:  
 $\frac{2x}{3} + 4 = 3$

A  $\frac{2}{3}$

B  $-\frac{3}{2}$


C  $\frac{9}{2}$

D  $\frac{21}{2}$

$$\frac{2x}{3} = 3 - 4$$
$$\frac{2x}{3} = -1$$
$$3(\frac{2x}{3}) = 3(-1)$$
$$2x = -3$$
$$\frac{2x}{2} = \frac{-3}{2}$$
$$x = -\frac{3}{2}$$

6

The perimeter of triangle  $DEF$  is given by the expression  $11x - 15$ .



Which expression shows the correct length of side  $EF$ ?

A  $4x - 4$

B  $4x - 14$


C  $7x - 1$

D  $7x - 11$

$$2x + 2 + 5x - 3 + EF = 11x - 15$$
$$7x - 1 + EF = 11x - 15$$
$$EF = 11x - 15 - 7x + 1$$
$$EF = 4x - 14$$

7

The cost,  $C$ , in dollars to print leaflets,  $n$ , is given by the formula  $C = 35 + 0.03n$ .



What is the cost of printing 900 leaflets?

A \$27.00

B \$35.00

C \$37.27

D \$37.27

$$C = 35 + 0.03(900)$$
$$C = 35 + 27$$
$$C = 62$$

Open Response

Grade 9 Assessment of Mathematics, Polynomials & Equations

1

Marc's Measurements

Marc wants to investigate the relationship between a person's foot length and their height. He measures the foot length ( $L$ ) and height ( $h$ ) of each of the students in his class.

He discovers that the relationship can be represented by the equation  $L = \frac{2}{5} + \frac{3}{20}h$ .

Determine how tall a person would be if their foot length is 25 cm.

Show your work.

$$100(25) = \left(\frac{2}{5} + \frac{3}{20}h\right)100$$
$$2500 = \frac{200}{5} + \frac{300}{20}h$$
$$2500 = 40 + 15h$$
$$2500 - 40 = 15h$$
$$\frac{2460}{15} = \frac{15h}{15}$$
$$164 = h$$

Marc is 164cm tall.

Open Response

Grade 9 Assessment of Mathematics, Polynomials & Equations

1

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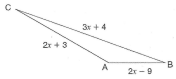
Open Response

Grade 9 Assessment of Mathematics, Polynomials & Equations

1

What Side?

The perimeter of the triangle below is 75 m.



Determine the measure of each side of the triangle.

Show your work.

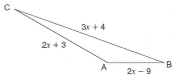
Open Response

Grade 9 Assessment of Mathematics, Polynomials & Equations

1

What Side?

The perimeter of the triangle below is 75 m.



Determine the measure of each side of the triangle.

Show your work.

$$75 = (3x + 4) + (2x + 3) + (2x - 9)$$
$$75 = 7x - 2$$
$$75 + 2 = 7x$$
$$\frac{77}{7} = \frac{7x}{7}$$
$$11 = x$$
$$3x + 4 = 3(11) + 4 = 33 + 4 = 37$$
$$2x + 3 = 2(11) + 3 = 22 + 3 = 25$$
$$2x - 9 = 2(11) - 9 = 22 - 9 = 13$$

Open Response

Grade 9 Assessment of Mathematics, Polynomials & Equations

1

Measuring Mass

The following table shows an expression for the mass of each of the four members of the Miller family.

| Member of the Miller Family | Mass (kg) |
|-----------------------------|-----------|
| Father                      | $4x + 6$  |
| Mother                      | $3x - 2$  |
| Daughter                    | $2x - 6$  |
| Son                         | $x + 7$   |

The total mass of all four members of the Miller family is 255 kg.

What is the Mother's mass, in kg?

2

Open Response

Grade 9 Assessment of Mathematics, Polynomials & Equations

Measuring Mass

The following table shows an expression for the mass of each of the four members of the Miller family.

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| Son                         | $x + 7$   |

The total mass of all four members of the Miller family is 255 kg.

What is the Mother's mass, in kg?

$255 = 4x + 6 + 3x - 2 + 2x - 6 + x + 7$

Open Response

Grade 9 Assessment of Mathematics, Polynomials & Equations

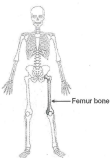
Bone Business

Scientists find that the height of a person,  $h$ , in centimeters, is related to the length of the person's femur bone,  $f$ , in centimeters, according to the following formula:

$$H = 69.09 + 2.24 f$$

According to the formula, what is the length of the femur in a person who is 178 cm tall?

Show your work.



Open Response

Grade 9 Assessment of Mathematics, Polynomials & Equations

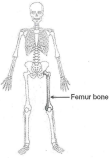
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According to the formula, what is the length of the femur in a person who is 178 cm tall?

Show your work.



Multiple Choice

Grade 9 Assessment of Mathematics, Polynomials & Equations

Which of the following is equivalent to the expression below?

$-5 + 2(3x - 4) - 1$

A  $-9x + 11$

B  $-9x - 5$

C  $6x - 10$

D  $6x - 14$

Isam's father gave him a box of chocolate bars. Solve the following equation to determine how many chocolate bars he received.

$$\frac{n}{3} + 8 = \frac{3}{2}(n - 1) + \frac{1}{6}$$

How many chocolate bars did Isam receive?

A 4

B 6

C 8

D 39

Temira needs to rent a car. She considers the following price equations, where  $C$  is the total cost, in dollars, and  $n$  is the number of days.

| Company           | Equation        |
|-------------------|-----------------|
| Rentway           | $C = 20n + 100$ |
| Cheepie's Rentals | $C = 25n + 50$  |
| Cars Care Cars    | $C = 50n$       |
| Drive Away        | $C = 15n + 125$ |

Which company should she choose if she is planning to rent the car for at least 10 days?

F Rentway

G Cheepie's Rentals

H Cars Care Cars

J Drive Away

If  $x = 3$ , what is the value of  $2x^2 + 5x$ ?

a 21

b 27

c 33

d 51

Multiple Choice

Grade 9 Assessment of Mathematics, Polynomials & Equations

The cost of a field trip,  $C$ , as a function of the number of students on the trip,  $n$ , is represented by the equation:

$C = 500 + 15n$

How many students went on the field trip if the cost was \$1025?

A 15875 students


B 102 students

C 69 students

D 35 students

While experimenting with a toy rocket, Dun determines that he can model the rocket's height,  $h$ , in metres, with respect to time,  $t$ , in seconds, using the equation:

$$h = \frac{1}{2}t^2$$



Which calculation correctly finds the value of  $h$  when  $t = 10$ ?

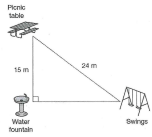
a  $h = \frac{1}{2} \times 10^2$   
 $= 6^2$   
 $= 36$

b  $h = \frac{1}{2} \times 10^2$   
 $= \frac{1}{2} \times 20$   
 $= 10$

c  $h = \frac{1}{2} \times 10^2$   
 $= \frac{1}{2} \times 100$   
 $= 50$

d  $h = \frac{1}{2} \times 10^2$   
 $= \frac{1}{2} \times 100$   
 $= 25$

The positions of the water fountain, the picnic table and the swings at a local park are shown below.



The Pythagorean theorem was used to determine the distance, in metres, from the water fountain to the swings. Which of the following is closest to this distance?

A 28 m

B 19 m

C 15 m

D 9 m